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BIOLOGICAL SUGGESTIONS.

EXTERMINATION IN ANIMAL LIFE.

Part II.—BY HUMAN AGENCY.

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(Continued from vol. ix. p. 345.)

WHEN we examine the direct action of man in animal extermination we may safely affirm that from the time of his appearance the whole fauna "groaneth and travaileth in pain together until now." In his early stage, when he hunted for food, there had arisen a predatory foe against whom size was no protection, but rather an inducement for slaughter; the substitution of the pastoral for the hunter stage of existence brought little amelioration, for then many animals were exterminated for the safety of the herds. Increasing civilization was the death-knell to many species, for sport not only claimed its own, but the industrial manufactures in daily life inaugurated a virtual reign of terror. Hides and tusks of mammals, feathers of birds, the oil of the cetacean, &c., were all brought to the altar of commerce, and frequently in such quantities as to have for ever destroyed the original contributors. Forests disappeared as mankind learnt to appreciate the value of timber. Animals hitherto little molested in the struggle for existence became almost decimated, as they were found to provide a delicacy for the table. Woman sought to increase her attraction for man by adorning her wearing apparel with the feathers

of beautiful birds, and thus the inception of a new feminine fashion often meant and means an extensive avian massacre in tropical forests. Unhappy animated nature might be said to shiver as man progressed; science has often been unable to preserve the remains of an exterminated species in a glass case. The prosperous tradesman who has achieved wealth in the sale or manufacture of the bodies of one class of animals has often, by these means, enabled his progeny to become wholesale slayers of others for pleasure; thus sport succeeds business, and soon rarity precedes extinction. The wealthy orchid grower so dearly loves his plants that his travelling agent not seldom depopulates the area of a local species to satisfy the housing capacities of glass structures at home. If a bird or insect has unfortunately sunk to the condition of rarity in its native haunts, or has become an endemic species, its complete decay is at once accelerated by the eagerness of naturalists to obtain specimens before it is too late. The names of new heroes will in the future be known to sport; the man who shot the last Lion* will follow an earlier record of the fortunate who slew the last White Rhinoceros.† The name of the executioner of the last of the Elephants should not be forgotten in the coming days when the world may be a vast shop under the direction of a body of eminent financiers.

The Beaver, exterminated in some of its former haunts, now lives on, it may be said, by a change of fashion. The case has been clearly stated by Marsh. When a Parisian manufacturer invented the silk hat, which soon came into almost universal use, the demand for Beaver's fur fell off, and this animal, whose habits prove an important agency in the formation of bogs and other modifications of forest nature, immediately began to increase, reappeared in haunts which it had long abandoned, and can no longer be regarded as rare enough to be in immediate

* "Africa is the only portion of the globe where the Lion remains lord of the forest, as the king of beasts. The question has frequently been discussed, 'Why should the Lion have vanished from the scene where in ancient days he reigned in all his glory?' The answer is simple—the Lions have been exterminated."—Sir S. Baker, 'Wild Beasts and their Ways,' vol. i. p. 307.

† The late Mr. J. H. Gurney writes:—"I have seen the man who exterminated the *Nestor productus* from Philip Island, he having shot the last of that species left on the island' ('Zoologist,' 1854, p. 4298).

danger of extirpation.* So small an insect as the gnat is, as pointed out by Mr. E. A. Butler, for its existence not independent of the action of man. In the evil days, when every house had its water-butt, and when stagnant ponds abounded on every side, often in close proximity to human dwellings, the conditions were so much the more favourable for the multiplication of gnats, and wherever such conditions now exist, the insects are liable to be both numerous and troublesome. But the extensive abolition of water-butts, the introduction of closed and indoor cisterns, and better land drainage have all tended to reduce the number of *Culicidæ* in this country, whatever may be the case elsewhere.† Small White Herons or Egrets are destroyed during the season in which they have their nests and young, in order to supply plumes for ladies' hats. A better feeling having been aroused even in female devotees to fashion, the shopkeepers found it advisable to state that these plumes were then artificially made. The late Sir William Flower found that these plumes consisted of genuine feathers, and protested: "One of the most beautiful of birds is being swept off the face of the earth under circumstances of peculiar cruelty, to minister to a passing fashion, bolstered up by a glaring falsehood."‡

If a sportsman visits South Africa for the first time, and has alone read the accounts of the game given by authors who wrote as recently as thirty or forty years ago, he will think he has been conveyed to the wrong continent. In many parts which then swarmed with game he will now find as many buck as he would meet with on a Surrey plateau, which some high veld so much resembles. Sandeman, travelling in 1878, bears witness to the charnel-house that then existed:—"While the waggons kept to the now well-worn track towards Heidelberg, A. and I took a wide tour of the veld in search of bôk, but, although we came across

* 'Man and Nature,' p. 84.

† 'Our Household Insects,' p. 234.—On the other hand, the destructive influence of these insects on man is detailed in a recent book reviewed in these pages (*ante*, p. 393), 'Malaria; a Neglected Factor in the History of Greece and Rome.'

‡ 'Nature,' liv. p. 204.—*Cf.* 'The Emu,' vii. p. 71, where Mr. Mattingley, under the title of "Plundered for their Plumes," records the destruction—"shot off their nests"—of the Australian Egrets, *Mesophoyx plumifera* and *Herodias timoriensis*.

myriads of bones, skulls, and horns of Wildebeeste and Blessebok, bearing witness to the wholesale slaughter which took place only a few years ago, when the Boers first found out the value of the skins, we did not come across any bok, although we saw plenty of fresh spoor. The massacres which then took place have thinned the game—to an almost incredible extent for so short a time—throughout the greater part of South Africa. In many parts the veld is literally speckled all over with the white-bleached bones of the bok killed only for their hides, and when stripped left to rot away.”* Alas! there is no zoological Ezekiel hardy enough to prophesy that there shall be a shaking and coming together of these bones. Man has indeed had dominion over the beasts of the earth in this neighbourhood, and these primitive Boers have proved Attilas to the South African mammalian fauna. The Elephant is gradually disappearing in British Central Africa; this, according to Mr. Sharpe, is not due to the number killed by Europeans, but to the fact that the natives throughout the country are constantly destroying them.† After the perusal of many African books on sport and travel one cannot help remarking on the amount of needless suffering inflicted on the Elephant by the inexperience of the sportsman in not striking the animal’s head where the bullet will penetrate the brain, thus not only ensuring instant death but also the safety of the destroyer. As an illustration, it is easy to cite from numerous records, and accounts of the unnecessary sufferings entailed on these creatures may be found in Von Höhnel’s ‘Discovery of Lakes Rudolf and Stefanie,’ or in Andersson’s ‘Okavango River,’ compared with the more skilful and effectual slaying described by Mr. Faulkner in his ‘Elephant Haunts.’ Dr. Junker quotes Westendorp to the effect that the enormous destruction of Elephants to supply the civilized world with ivory is shown by the calculation that in the twenty years from 1856 to 1876 Africa supplied Europe on an average with 1,500,000 lb. of ivory annually, besides 250,000 lb. exported to India, and about 150,000 lb. to America, representing altogether at least 51,000 Elephants.‡ Mr. Scott Elliot, in East Africa, describes the game as still abundant between Languru and the Kikuyu bush,

* ‘Eight Months in an Ox Waggon,’ p. 106.

† ‘Geographical Journal,’ vol. vii. p. 374.

‡ ‘Travels in Africa, 1875-8,’ Eng. Transl., p. 304.

despite the exterminating proceedings of sportsmen. "A tale of 380 head in three months fell to one sportsman."* Andersson mentions that his assistant Hans once shot with his own hand no fewer than nine Rhinoceros in the course of a single day;† he also states that Oswell and Vardon killed in one year no fewer than eighty-nine of these animals.‡ Instances could be multiplied and recorded of the excessive and wanton destruction of the South African mammalian fauna, but they do not need repetition. The Boer still loves to shoot for sport while there is still a market to at least defray expenses; European sportsmen still expend large sums to achieve the result of a "record bag." Could any game survive such a war? Is game preservation, now established, too late? The Tsetse-fly afforded these unfortunate ruminants some protection, for, though harmless to them, it caused certain death to oxen, and hence the waggon, with its hunters, could not travel through the "fly country." But this immunity will soon be a thing of the past. Hunters do not care to shoot on foot in such a climate, nor could they easily do so, and thus the Zulu country long held large game. "But now, since it has become the fashion for the hunters to arm natives to shoot for them, even in this country extermination is going on rapidly."§

In America the Bison is a well-known instance of man's extirpation. For its destruction the telegraph-wire was actually put in use. According to Mr. Baillie-Grohman, in the early eighties, when the "Northern Pacific" was being built through Dakota and Montana, the movements of the "Northern herd," which was practically the last big band of Bison in existence, was known from day to day to the gang of market-hunters along the railway, who were supplying the contractors with the game required to feed the four thousand navvies in their employ.|| Those engaged in the cattle-ranch business considered that the Bison could not be slaughtered too quickly, "for were not their thousands wasting the bunch-grass upon which the more valuable domestic kine, driven in vast herds from distant Texas,

* 'A Naturalist in Mid-Africa,' p. 17.

† 'Lake Ngami,' p. 58.

‡ *Ibid.*, p. 401.

§ T. E. Buckley, Proc. Zool. Soc. 1876, p. 278.

|| 'Fifteen Years' Sport and Life,' &c., p. 29.

were to fatten?"* Colonel H. Inman, late Assistant-Quarter-master of the U. S. Army, in his 'The Old Santa Fé Trail,' states that in Kansas alone, between 1868-81, 2,500,000 dols. were paid out for Buffalo bones gathered in the plains, and used by the carbon companies. The price paid averaged eight dollars per ton of bones, so that according to his calculation the above sum represented the skeletons of over 31,000,000 Buffalo.† In 1885 Peccaries were so abundant in the counties of Medina, Uvalde, and Zavalla, Texas, that their well-known trails were everywhere to be seen, while their favourite haunts could be readily picked out by the peculiar musty odour characteristic of these little animals. Shortly after this date, hogskin goods being in favour, a price of fifty cents each was offered for Peccary hides, with the result that by 1890 the Peccaries had become practically exterminated.‡ In 1873 Leith Adams stated that "the Moose is decreasing steadily; indeed, considering the wholesale destruction practised by settlers and Indians, it is remarkable how many survive."§

The hunting spirit is still strong in America. Mr. T. S. Palmer states that in the United States several States now require both residents and non-residents to secure licences before hunting. The returns for 1903 show that in ten of the States which have such a system, *viz.* Colorado, Idaho, Illinois, Michigan, Minnesota, Nebraska, North Dakota, Washington, Wisconsin, and Wyoming, the total number of licensed hunters was 261,241. The largest numbers in any of these States were 73,823 in Wisconsin and 95,250 in Illinois, and the average in all was 26,124. "The destruction which an army of 26,000 hunters roaming at will over any State might bring about is beyond computation."|| Again, according to the same writer, the population of the United States, on June 1st, 1905, exclusive of Alaska, Hawaii, and Porto Rico, was estimated by the Census Bureau at 82,565,005, and the population of the sixteen States which issued both resident and non-resident licences at

* Cf. Baillie-Grohman, 'Fifteen Years' Sport and Life,' &c., p. 29.

† *Ibid.*, p. 169.

‡ Lucas, 'Rep. Nat. Mus. Washington,' 1891, pp. 610-11.

§ 'Field and Forest Rambles,' p. 90.

|| 'Yearbook Dept. Agric.' 1904, p. 511.

23,848,780. The total number of licences issued in these States was 503,049. "In other words, a little more than half a million persons were licensed to hunt, of whom only 3,043, or six-tenths of 1 per cent., were hunting outside their own States."*

Guillemard writes that on Masafuera and Juan Fernandez Islands, off the coast of South America, a few skins of the fur Seals are still taken, "and in bygone days the South Shetland, Crozet, and Falkland Islands were the resort of countless thousands of these animals. But they are now nearly extinct, and almost every Seal-skin that finds its way into the London market is obtained upon one or other of the islands rented by the Alaska Commercial Company."†

The inevitable destruction of the Alligator "fishing" in Florida is being hastened by the robbing of the reptile nests of their eggs. According to Dr. E. D. Cope: "Facts recently gathered by the Fish Commission show that the reptiles cannot long escape practical extermination." Between the years 1880 and 1894 it has been estimated that 2,500,000 Alligators were killed in Florida.‡ So persistently has the Wood-Duck (*Aix sponsa*) been pursued that, according to Mr. Wells W. Cooke, in some sections it has been practically exterminated. Even in States in which it still breeds commonly, as in Delaware and Maryland on the Atlantic Coast, and in Illinois in the Mississippi Valley, public sentiment fails to recognize the importance of adequately protecting the bird, and the laws still permit it to be destroyed late in the spring. As a result the Wood-Duck is constantly diminishing in numbers, and soon is likely to be known only from books or by tradition.§

If we transport ourselves from Africa, the once paradise for Antelopes, to Australia, where marsupials hold a corresponding sway, we see the same process of destruction, the same inevitable extinction in progress. What availeth numbers when, at Peak Downs alone, as we learn from Carl Lumholtz, one of the sheep-owners told him that in the course of eighteen months he had killed 64,000 of these animals, especially Wallabies (*Macropus*

* 'U.S. Dept. Agric. Bur. Biol. Surv.' Circular No. 54, p. 14 (1906).

† 'Cruise of the Marchesa,' second edition, p. 142.

‡ 'Ann. Rep. Smithsonian Instit. for 1898,' p. 171 (1900).

§ 'U. S. Dept. Agric. Biol. Surv.' Bull. No. 26, p. 8 (1906).

dorsalis) and Kangaroo-Rats (*Lagorchestes conspicillatus*), and also many thousands of the large Kangaroo (*Macropus giganteus*)? * What animal life can long withstand such wholesale massacres? The discoveries of Tasman, Dampier, and Cook will result in the total extinction of more than one human race, and in the partial extermination of a singular land fauna belonging to a mighty island-continent. The Kangaroo will follow the Aborigine, and both in time become parts of a story to be told, an incident in the battle of human civilization. Other animal life in Australia is beginning to feel the destructive appetite of civilized man. The Cassowary is too large and distinct a bird to escape attention. Of *Casuarius australis*, Mr. Ramsay, in 1876, relates:—"It was tolerably plentiful only a few years ago even in the neighbourhood of Cardwell, but since the advent of sugar-planters, &c., on the Herbert River and adjacent creeks these fine birds have been most ruthlessly shot down and destroyed for the sake of their skins, several of which I saw used for hearth-rugs and door-mats."† Prof. Dendy, with good reason, urged upon naturalists in Australia and New Zealand the advisability of making the most of their time and opportunities in securing representatives of the cryptozoic (sun-hating) fauna ere it be exterminated by the wholesale destruction of forests that is going on. "For when the clearing process is complete, and the last logs have disappeared from the ground, we may expect to lose sight for ever of many peculiar forms which formerly dwelt there."‡ Nearly half a century ago Bennett saw what was coming, and uttered his warning:—"One of the exciting causes of the destruction of every living native animal that can be met with is the pretence of enriching our museums, while at the same time the overstocked market in Europe renders them for the most part unsaleable; and it is a well-known fact that the skins of Australian birds, &c., have been re-exported from England to Australia for sale."§ According to Coghlan ('Wealth and Progress of New South Wales'), the New South Wales Government spent in 1891 the extraordinary sum of £50,000 in bonuses

* 'Among Cannibals,' p. 29.

† 'Proc. Zool. Soc. Lond.' 1876, p. 120.

‡ 'Address, Biol. Sect. Austral. Assoc. Adv. Sci. 1895.'

§ 'Gatherings of a Naturalist in Australasia,' p. 175.

for the destruction of 871 Emus, over one million of marsupials, 65,000 Hares and Rabbits, 11,530 Dingoes, 3502 Eagle hawks, and some other marauders. From a back number of the 'Sydney Morning Herald' it appears that in the year 1888 upwards of ten thousand Emus were destroyed in one district alone, while in the same period fifteen hundred of their eggs were broken on one estate.* The Lyre-bird of Australia, which lays but one egg each season, is doomed by the possession of a magnificent tail. Mr. Aflalo states:—"Not long since, for example, two enterprising brothers employed a number of men to shoot the luckless male birds, in which, after some practice, they were unfortunately so successful that five hundred dozen of the beautiful tails were reported to have reached Sydney in the course of a few weeks.† Of the Moas of New Zealand, some authorities consider that they were killed off by the race which is believed to have inhabited New Zealand before the advent of the Maoris.‡ The Mamo, a honey-sucker (*Drepanis pacifica*), restricted in its range to the Pacific Islands, and now apparently extinct, has had a cause of its disappearance suggested by Mr. Scott Wilson. He saw some of the celebrated feather wreaths, or "leis," of the natives composed of yellow feathers taken from this bird, and from the fact that the Hawaiian name of the bird "Mamo" is the same as that of the costly war-cloaks, he concludes that the robes in olden times were chiefly wrought of the beautiful golden-yellow feathers from its back, which are much deeper in colour, as they are larger and longer, than the axillary tufts of the O-o (*Moho nobilis*). As only a few feathers on each bird were used, it may be imagined how many thousand birds it required to furnish the feathers of a single robe, and it is a greater wonder that there were enough birds than that the species of the brighter colour became extinct. Small bunches of these feathers were received by the kings as a poll-tax from the lower classes of the people, but there were not enough, so the chiefs used to have "a regular staff of birdcatchers who were expert in this vocation."§

* Cf. Aflalo, 'A Sketch Nat. Hist. Australia,' p. 104.

† *Ibid.*, p. 131.—Cf. also 'The Emu,' v. p. 57: "Notes on the Victoria Lyre-bird (*Menura victoriæ*)," by A. E. Kitson.

‡ Lydekker, 'Phases of Animal Life,' p. 152.

§ Cf. Lucas, 'Rep. Nat. Mus. Washington,' 1891, p. 628.

Europe tells the same tale. Organized Government destruction is often a most deadly means of extermination, especially when, as is generally the case, monetary rewards are paid for the animals slain. The following is the official list of birds and beasts of prey killed throughout Norway during the years 1893 and 1894:—

	Bears.	Wolves.	Lynxes.	Gluttons.	Foxes.	Eagles.	Hawks.
1893.	72	50	56	40	11,400	969	4846
1894.	57	37	44	46	8,646	1081	4727*

According to Sir H. Pottinger: "Taking consecutive returns of from forty to fifty years ago, we find that, on a rough average, considerably over two hundred Bears were killed annually in Norway, about the same number of Wolves, half as many Lynxes, and a quarter as many Gluttons."† The comparison of these figures will tell its own tale. The Glutton alone seems to hold its own, a fact which, as the above-quoted writer points out, "speaks volumes for the stealthy habits of these animals, and the secure fastnesses which the Norwegian wilds afford them. They alone of all the outlawed tribes have succeeded in holding their own against the vengeful persecution of man." In the palmy days of Rome many animals must have been more plentiful than now, and have been decimated by the requirements of the arena. We read that four hundred Bears were killed in a single day under Caligula; three hundred on another day under Claudius. Under Nero four hundred Tigers fought with Bulls and Elephants; four hundred Bears and three hundred Lions were slaughtered by his soldiers. In a single day, at the

* 'Zoologist' (3), xix. p. 425.—On the other hand, even administrative destruction is sometimes powerless to exterminate. As Prince Kropotkin writes:—"That terrible enemy of the crops of South Russia—the '*Souslik*' (*Spermophilus*)—of which some ten millions are exterminated every year by man alone, lives in numberless colonies; and while the Russian provincial assemblies gravely discuss the means of getting rid of this enemy of society, it enjoys life in its thousands in the most joyful way" ('Nineteenth Century,' vol. xxviii. p. 704).—A similar record applies to the Rabbit in Australia, of which a few years ago, in New South Wales alone, the Government paid for the skins of twenty-seven million Rabbits in twelve months, and yet extermination is as far off as ever (writer in the 'Times,' quoted by the 'Spectator,' January 4th, 1896).

† 'Badminton Magazine,' vol. ii. p. 299.

dedication of the Colosseum by Titus, five thousand animals perished. Under Trajan the games continued for one hundred and twenty-three successive days. And, says Mr. Lecky, these are but a few of the many examples given by Magnin, who has collected a vast array of authorities on the subject.*

It is probable that many species of wildfowl only continue to exist by their migratory habits and their consequent long absence from the neighbourhood of the gunner. What a more prolonged visit to the areas where shooting is in vogue would effect on their numbers may be estimated by the perusal of a few inventories of game-bags. "As many as eighty-five, and upon another occasion one hundred and six, Teal have been picked up after a well-directed shot from a punt-gun—the former by Sir Ralph Payne-Gallwey, the latter off the Irish coast."† "Sometimes during a lull in a spell of rough weather vast flocks of Wigeon concentrate themselves on the ooze, and it is at this time they are sought by the puntsman or fowler. When good shots have been obtained at such masses of birds over a hundred have been killed at a single shot, and this explains why Wigeon are sold so cheaply in the markets."‡ Long ago Kohl recorded that on the coasts of the North Sea twenty thousand Wild Ducks were usually taken in the course of the season in a single decoy, and sent to the large maritime towns for sale.§ After this, though no reasons are given, we are not surprised to read that the Pied Labrador Duck (*Somateria labradoria*), formerly abundant on the coast of Labrador and the mouth of the St. Lawrence, appears to have become extinct since 1852.|| Snaring is equally destructive. On the island of St. Kilda, with his fowling-rod one man has been known to have once bagged no fewer than six hundred and twenty Puffins in a single day.¶ On the same island it has been calculated that 22,500 Solan Geese have been caught and con-

* 'Origines du Théâtre,' pp. 445-53. Quoted by Lecky, 'Hist. Europ. Morals,' vol. i. p. 280.

† Cf. Watson, 'Poachers and Poaching,' p. 198.

‡ Watson, *ibid.*, p. 201.

§ 'Die Herzogthümer Schleswig und Holstein,' i. p. 203. Quoted by Marsh, 'Man and Nature,' p. 97.

|| Ogilvie Grant, 'Royal Nat. Hist.' iv. p. 355.

¶ Kearton, 'With Nature and a Camera,' p. 81.

sumed in a single year.* One woman has been known to snare as many as 280, and another 127 Puffins in three hours;† while, on the authority of Mr. Sands, who lived on St. Kilda for about nine months, it is stated that in one year alone close upon 90,000 were killed by the natives.‡

The giant Sturgeon or Hausen (*Acipenser huso*), with all the protection afforded by great fecundity, was at one time to be met with in the Danube by thousands, “but relentless slaughter has greatly reduced not only their numbers but likewise their size.”§ In Russia the size of the Pike-perch (*Lucioperca sandra*) is becoming smaller owing to the demand being greater than the supply. About 26,000,000 of these fishes are exported from Astrakhan every year.|| In Jersey Mr. Hornell states:—“I have known as many as two hundred immature Guernsey Crabs (*Cancer pagurus*) in one man’s basket, not one of which was of the proper size of $4\frac{1}{4}$ inches across the back, while time after time I have seen men bringing back six to twelve or more Lobsters averaging from five to seven inches long. What wonder, then, that after such improvident and senseless procedure there should ensue a period of dearth? At every spring tide hordes of men and boys invade the littoral armed with basket and hook, bent on an indiscriminate collection of Crabs and Lobsters of any size procurable.”¶ We have heard of decrease in the fish of the Norfolk Broads, and we read:—“In a fortnight’s fishing on Oulton Broad, Suffolk, a lady and her husband have landed 2539 Roach.”***

It is needless to go on recording facts which are everywhere obtainable proving that man’s hand has fallen heavily on nearly every other living creature. What we have recorded is principally the effect of his direct action. His indirect action has been equally destructive, and we can only find space to give a few instances. The domestic Cat was introduced to the island of

* Kearton, ‘With Nature and a Camera,’ p. 90.

† *Ibid.*, p. 112.

‡ *Ibid.*, p. 113.

§ ‘Roy. Nat. Hist.’ v. p. 515.

|| Seeley, ‘The Fresh-water Fishes of Europe,’ p. 41.

¶ ‘Journ. of Marine Zool. and Microscop.’ ii. p. 75.

*** ‘Sun,’ October, 1902.

Rarotonga by missionaries, and for a time proved a blessing by keeping down the small indigenous Rat which then overran the island. Rats becoming scarce, the Cat took to hunting birds. Some species were soon exterminated, and other birds have taken refuge among the almost inaccessible rocks of the interior. The stillness of the forest is now intolerable save for the hum of insects.* We may mention the more or less complete extirpation of Rattlesnakes in North America that followed the introduction of hogs. In the Virgin Islands "the land mollusks were completely destroyed by the practice of burning over the land, and only dead shells remain to show their former abundance in that locality."† The most deadly enemy of the Prairie-hen (*Tympanuchus americanus*) is the prairie fire in spring, which destroys every nest within its sweep. According to Mr. E. W. Nelson, in the early seventies in North-western Illinois, the farmers in many places burned the prairies in spring after the Prairie-hens had nested, and often gathered for household use large numbers of the eggs thus exposed.‡ What the Boers have done to the fauna of South Africa by their annual grass fires can never be estimated, as we scarcely can tell what has been destroyed. The small green Cicadas were very plentiful, and their shrill noise well known, at Sydney. Now, Mr. Le Souëf tells us, "the imported Sparrows in the neighbourhood of that city looked upon these insects as one of their sources of food-supply, and when they heard their note at once attacked them. In course of time only the quiet ones will survive, or those that sing at night."§ *Aporia crataegi*, a white Pierine butterfly, is now becoming very scarce in its old haunts in this country. According to Mr. Kirby it is supposed that its disappearance is due to the multiplication of insect-eating birds, a consequence of the Wild Birds Protection Act.|| The moth "*Lœlia cænosa* has become practically extinct in Britain during the last thirty years," Mr. Tutt remarks. "This is generally supposed to have been due to the drainage of part of Barwell and Wicken Fens, but it was probably partly due

* W. Wyatt Gill, 'Jottings from the Pacific,' p. 126.

† Lucas, 'Rep. Nat. Mus. Washington,' 1891, p. 613.

‡ Judd, 'U. S. Dept. Agriculture,' Bull. No. 24, p. 13 (1905).

§ 'Wild Life in Australia,' p. 245.

|| 'Hand-book to the Order Lepidoptera,' vol. ii. p. 141.

to the greed of collectors, for a professional collector told me that the larvæ were so abundant five-and-twenty years ago (this was written in 1896) that it paid him to give up his ordinary work in order to collect all he could find, as he received from a London dealer about eighteenpence a dozen for them. This man alone collected some thousands every year.”* “In Victoria (Australia) the days of the Lyre-bird (*Menura victoriæ*) are numbered, unless it develop the habit of nesting in trees or spots inaccessible to its far more dangerous enemy—an introduced one—the European Fox.”†

The extermination of man by man, the extinction of aboriginal races by more progressive peoples, is a story well known to anthropologists, and requires separate detail. Wild nature must have ever regarded the genus *Homo* as its deadliest foe.

Even the American trees have suffered by vandal hands. Miss S. Fenimore Cooper tells us:—“At a particular point in the wilds of Oregon, near the bank of the Columbia River, there stood a single tree of great size—one of the majestic pines of that region, and long known as a landmark to the hunters and emigrants passing over those solitary wastes. The members of an expedition sent out to explore that country by the Government, arriving near the point, were on the watch for that pine to guide their course; they looked for it some time, but in vain. At length, reaching the spot where they supposed it ought to have stood—a way-mark in the wilderness—they found the tree lying on the earth. It had been felled and there left to rot by some man, claiming, no doubt, to be a civilized being.”‡ In Australia the big gum-trees near the township of Fernshaw, some fifty miles north of Melbourne, in size completely eclipse the Californian Wellingtonias, but are being rapidly exterminated. “The land they grow on is good land, with twenty or more feet of vegetable soil in many spots, and it is wanted; and so the gums are given as victims to the axe and the firebrand.”§

* ‘British Moths,’ p. 86.

† Kitson, ‘The Emu,’ v. p. 58. Cf. direct persecution by man (*ante* p. 409).

‡ ‘Journ. Naturalist in United States,’ vol. i. p. 255 (1855).

§ Ward, ‘Rambles of an Australian Naturalist’ (edited by P. Fountain), p. 86.

AN ANNOTATED LIST OF CORNISH FISHES.

BY JAMES CLARK, M.A., D.Sc., A.R.C.S.

IN this list an attempt is made to indicate the present status and distribution of fishes in the Cornish waters, which is largely based on observations made and data obtained during the past eight years. References to the works of Couch, Matthias Dunn, Cornish, and Day are made only in the case of rare species, exceptional occurrences, or change in distribution, migratory habit or numerical status. The limits of the paper prevent more than an occasional passing remark on the habits, breeding, or food of the fishes mentioned, and as the fishes of Scilly will be treated separately, all special reference to them is omitted.

The writer wishes to express his deep indebtedness to his fellow-members on the Fisheries Committee of the county, and especially to Mr. Matthias Dunn, son of the great fisherman-naturalist of the same name, and to Mr. E. J. Pezzack, County Fishery Officer, for valuable help most generously given; to his friend Dr. E. J. Allen for placing all the resources of the Marine Biological Laboratory so freely at his disposal; to Mr. H. Rice, of Truro, for numerous personal notes on fishing in the St. Mawes district; to fishermen all round the county for specimens, and for frequent permission to handle their catches; and lastly to his biological students at the Technical Schools, Truro, for loyal and enthusiastic assistance in every department of the subject.

To distinguish between Matthias Dunn, father and son, the former is referred to throughout under his full name, the latter as Dunn *f.* (= *filius*).

The Perch (*Perca fluviatilis*, L.) is not indigenous, but has been naturalized in many ponds throughout the county. Thirty or forty years ago the Sea Bass (*Labrax lupus*, Day) appeared off the Cornish coast almost every year about the month of August

in enormous shoals that made the surface of the water boil like a strong tide (Dunn *f.*). These shoals specially favoured the Gwineas Rock, near Gorran, the Gull Rock, Portscatho, the Runnelstone, and the Wolf, and appeared occasionally in the sandy bays of the south and east, and at least once on the north coast, namely, at Perranporth about 1864 (Hicks). At Gwineas Rock Matthias Dunn found it impracticable to use a seine on account of the broken nature of the beach, and employed dynamite to kill the fish till stopped by Act of Parliament. By this means as many as six hundred fish, up to 10 and 12 lb. in weight, could be obtained in a morning (Dunn *f.*). In recent years vast shoals have been scarce, and till quite lately apparently restricted to the west of the county. During the past three years, however, they have been reported from Coverack, the Bizzies in Gerrans Bay, and the Gwineas Rock, as well as from the Runnelstone, the Wolf, and Land's End. Bass, however, is usually common throughout the summer, and especially in August and September, all round the coast, and may be caught in abundance with hand-lines in favoured places like St. Mawes, the Gull Rock, Portscatho, west of the Manacles, and around Newquay; and with long lines in deeper water. Mullet seiners, too, sometimes catch a small shoal of Bass, or come upon them when feeding where rocks abut on the sand. In stormy weather, both on the north and on the south coast, they often feed in numbers in shallow water close to the land, especially on a lee shore. They are then occasionally taken in a narrow trammel shot between them and the open sea, into which attempts are made to drive them by throwing stones. They are, however, difficult to frighten, and though they may dart away at the splash, return immediately, and swim through and round the centre of disturbance. Bass are often taken in the Fowey and Tamar, occasionally in fresh water beyond the reach of the tides.

The Comber (*Serranus cabrilla*, Linn.) occurs frequently along the south coast on broken, rocky ground during the summer. It is often common at Polperro (Robinson), at Mevagissey and Gorran, and in July, 1905, was plentiful for a few days near Coverack. Day says it is rare at Penzance, but during the last eight years it has been taken several times to the east of St. Michael's Mount, and occasionally in the Crab-pots at

Newlyn. It is evidently common at times further west, as in August, 1906, the writer found several being used as bait at Porthgwarra. In July, 1904, a small specimen, about seven inches long, was sent in for identification from Sennen Cove, the most northerly point in the west at which it has been found. The Dusky Perch (*Epinephelus æneus*, Geoffr.) was described and figured by Couch from a Polperro specimen as *Serranus gigas*. Two or more examples were obtained subsequently, but it has not been recorded for the last sixty years. Stone Bass (*Polyprion cernium*, Day) is evidently of more frequent occurrence than formerly. In July, 1891, four were gaffed at some floating barnacle-covered timber near Zennor; in 1892 Matthias Dunn sent one from Mevagissey to the Plymouth Laboratory, and in 1894 or 1895 he took five or six close to Gorran Haven when no wreckage was in sight. In 1893 J. B. Cornish captured one near some wreckage at Newlyn. In August, 1899, two were obtained feeding on a barnacle-covered log at the south end of the Manacles; in July, 1902, one was taken on a hand-line near the outer Whelp Rock at the Dodman; a few weeks later one was sent in from Newquay; and in June, 1906, several were seen, and one, twenty-two inches long, captured near Porthgwarra. Apparently the only example of the Maigre (*Sciæna aquila*, Lacep.) identified recently is one, twenty-nine inches long, caught in a seine near St. Anthony Lighthouse, Falmouth, on the 11th of September, 1903. The Four-toothed Gilt-head (*Dentex vulgaris*, Cuv. et Val.) has not been recorded since 1851. The Black Sea Bream (*Cantharus lineatus*, Mont.) is very scarce. A young specimen, six and a quarter inches long, was taken by Holt in the Hamoaze, at the mouth of the Lynher, in July, 1897 (M. B. A.), and three adults were captured with a hand-line baited with lugworm off Trewavas Head on the 7th of August, 1902. The Bogue (*Box vulgaris*, Cuv. et Val.) has not been recorded since 1873. The Sea Bream (*Pagellus centrodontus*, De la Roche) is common all round the coast, and sometimes congregates in great numbers, especially in the late summer. After a large dumping of Mackerel, it is almost always much in evidence, particularly in Mount's Bay. Very large specimens are often obtained off the Runnelstone, and occasionally near Newquay. The great hauls taken by the steam trawlers are

said lately to have diminished very considerably its numbers (Dunn f.). The young, called "chad," are often abundant in the coves, and take bait very freely in the summer and autumn. Spanish Bream (*Pagellus bogaraveo*, Brunn.) is now much scarcer than formerly (Dunn f. and Rice), but single specimens are still frequently taken with baited hooks along the south coast. During the last eight years examples have been identified from Polperro, Mevagissey, Percuil River, Cadgwith and Mousehole, and several others have been reported. *Pagellus owenii* Günther, and *P. acarne*, Cuv. et Val., have each been recorded once from the county (Day). The Pandora, or King of the Brems (*P. erythrinus*, L.), is probably common, but is generally confused with other Brems. It was plentiful in Mount's Bay in 1906, and several were taken at Cadgwith in 1907. Specimens have also been identified from the Edges, Polperro, from Gorran, and from the Manacles. Couch's Sea Bream (*Pagrus orphus*, Risso) is represented in the British fauna by a single specimen taken near Polperro in 1842 (Day). The Gilt-head (*P. auratus*, L.) is another rare accidental visitor, last recorded in 1870.

The Red Mullet, or Surmullet (*Mullus barbatus* var. *surmuletus*, L.), is locally common along the south coast, but scarce on the north. Matthias Dunn used to say that it very greatly diminished in numbers after the wet, sunless year of 1879, and was never again so plentiful. In March it is taken by the trawlers fifteen to twenty miles out at sea, but by July it comes closer inshore, and is then taken chiefly by ground-seines, but occasionally by trammels and set nets. It appears to feed by preference where rocks and rocky ledges rise out of sand, and so close to the rocks themselves that on a highly favoured spot near St. Mawes, where thousands are taken every year, the boat has literally to scrape against the rock to be successful. Another favourite ground near Falmouth is a narrow inshore lane of sand, with shallow rocks inside and bigger rocks to seaward, that stretches from off Killigerran Head towards the Gull Rock beyond Portscatho. Near Mevagissey Matthias Dunn would occasionally take as many as six hundred in a day, and in season it is still plentiful on at least two very limited areas there. It is taken regularly and often in quantity off the mouth of the Helford River, and, with trammels, in the estuary itself. In the

west, one of its favourite haunts is near Lamorna, but it is usually taken in some quantity in many other districts where congenial feeding-grounds occur. At St. Ives it is taken in seines, but is not plentiful. Specimens are occasionally taken inshore during the winter. One, for example, was captured near St. Anthony early in January, 1902, and another near Portscatho in December, 1903. It is doubtful if the Plain Mullet (*M. barbatus*, L., type) has ever been identified with certainty in the county. A careful watch has been kept for its occurrence for the past eight years, but without success.

The Wrasses are a perplexing group, because of their remarkable fin and colour variation, and for the past five years they have in consequence received considerable attention at Truro. Their strong hard flesh makes them very useful bait, especially for Lobster-pots. The Ballan Wrasse (*Labrus maculatus*, L.) is very common on rocky, weed-covered shores all along the south and west, and in patches along the north coast. The most abundant forms are of a warm brownish-yellow or greenish-brown colour, with a bright blue or nearly white centre on every scale of the head and body. Bluish forms, too, are not uncommon. The variety *lineatus*, Don., green with narrow longitudinal bands of yellow, is common at Mevagissey, at Gyllyngvase, Falmouth, between the Manacles and Coverack, and on the north coast near Strace Pool, at the head of Watergate Bay, and probably occurs at intervals all along the coast. At Gyllyngvase yellow bands are occasionally replaced by smears of dull brown passing gradually into the green, and one has been obtained there of a dull bottle-green, with whitish spots. Forms in various shades of green, from pale sage to brightest emerald, sometimes with white body spots, but generally without them, have been brought in from time to time, usually from the *Zostera* beds at Falmouth and Helford. On the 13th of July, 1907, a fine specimen, over four pounds in weight, of greenish umber-brown with a broad orange band on both sides and a pale spot on each scale, was sent in from Cadgwith. A pale yellow form was common near the Gurnard's Head in September, 1906. Red forms are usually scarce, but have been obtained in various shades, from pale carmine to deep mahogany; the former at Polperro and Scilly, the latter once at Cadgwith. Holt, however,

has shown that within certain limits an individual may change its colours in comparatively short time. The Comber has been given specific rank, but is only a form with a more or less continuous white band along each side, from the eye to the base of the caudal fin. About half-a-dozen specimens have been seen during the past eight years from the south coast, and one from St. Ives. The Cook, or Cuckoo Wrasse (*Labrus mixtus*, L.), is common along the south and west on rocky bottoms in deeper waters than the Ballan Wrasse. When fishing near rocks two or three miles out to sea, one often finds it unpleasantly plentiful. On the north coast it appears to be very local. The male of this species is Couch's Blue-striped Wrasse, and the female his Three-spotted Wrasse. The colours show great variation. The Conner (*Crenilabrus melops*, L.) is plentiful in rock-pools, and close inshore on a seaweed bottom all round the coast, and especially in the west. The species is very variable, but it has not been found practicable to apply the varietal names. Jago's Goldsinny (*Ctenolabrus rupestris*, L.) is by no means common, but occasional specimens have been found lately at Mevagissey, Coverack, Mount's Bay, and one in July, 1906, near Sennen Cove. The only two British specimens of the Scale-rayed Wrasse (*Acantholabrus palloni*, Risso) known to Day were obtained near Mevagissey, the last about seventy years ago. The Rock Cook (*Centrolabrus exoletus*, L.) was not considered rare by Couch or Cornish; but the only specimens seen by the writer are two from Cadgwith in June, 1901, and one from a Crab-pot from Porthgwarra. It has been reported from Polperro by Robinson. A single specimen of the Rainbow Wrasse (*Coris julis*, L.) was taken in Mount's Bay in 1802.

The Miller's Thumb, or River Bullhead (*Cottus gobio*, L.), is fairly common among the clearer streams of the county. The Father-Lasher (*Cottus scorpius*, L.), though a northern species, is of very frequent occurrence all round the coast in rock-pools, and in shallow water on weed-covered beaches. The Long-spined Bullhead (*Cottus bubalis*, Euphr.) is plentiful on rocky bottoms from tidal pools down to deep water. The Grey Gurnard (*Trigla gurnardus*, L.) is very common on trawling-grounds all round the coast, but Dunn *f.* believes that the enormous quantities taken by the steam trawlers have perceptibly diminished

its numbers. Up to about thirty years ago, he says, large shoals were of frequent occurrence in the Bristol Channel, and it was often caught by lines hanging over the stern of passing ships. Such shoals are occasionally reported still. An enormous one was seen off the Wolf in July, 1900, and another about ten miles south of the Lizard in June, 1902. One was seen about twenty miles north-west of Pendean in 1901, and another a little further to the north in 1905. The Piper (*Trigla lyra*, L.) varies greatly in number, but is at times fairly common, though usually scarce in winter. It was plentiful, however, some miles south of the Dodman in December, 1903. Cornish considered it a scarce fish in the west of the county, but steam trawlers in some years find it moderately common there. The Tub or Sapphirine Gurnard (*Trigla hirundo*, L.) is usually more plentiful than the Piper in the trawling-grounds of the south and west, and is occasionally taken with bait on the north coast. The Streaked Gurnard (*Trigla lineata*, Gmel.) was formerly considered very scarce, but off the south coast it is now of regular occurrence, and small catches of a dozen up to a hundred or more are brought in by Newlyn boats from the "Gurnard" grounds. Similar quantities are occasionally noticed among the catches at Gorran and Mevagissey, and it is a well-known fish at Polperro. The writer obtained three along with Red and Grey Gurnard with a beam-trawl in the Silver Pits, Gerrans Bay, in July, 1902, and seven a few days later on the "Steam trawlers' Ground," Falmouth Bay. Red Gurnard, or Elleck (*Trigla cuculus*, L.), is common at all seasons on the trawling-grounds round the coast. It is very largely used for Crab-pot bait, especially at St. Ives. The Lanthorne Gurnard (*Trigla obscura*, L.) was obtained nearly sixty years ago at Falmouth and Helford, but has not been recorded since. The Pogge, or Armed Bullhead (*Agonus cataphractus*, L.), was well-known to Couch as a Cornish fish, but has apparently become very rare since, as it was never seen by Matthias Dunn or by Cornish. In July, 1897, Holt obtained a specimen from the mouth of the Lynher River; and in August, 1902, two were dredged in the mouth of Helford River. The Armed Gurnard (*Peristethus cataphractus*, Gmel.) has not been recorded since the time of Couch.

The Adult Lump sucker (*Cyclopterus lumpus*, L.) is occasion-

ally entangled in the Mackerel nets ten to twenty miles south of the Dodman (Dunn *f.*). It has been taken several times lately in Falmouth Bay, and is of fairly frequent occurrence about Penzance. Immature specimens, from 1 lb. upwards, have been fairly common lately some miles out at sea all along the south coast. Cocks found a solitary specimen of the Sea Snail (*Liparis vulgaris*, Flem.) in Falmouth Harbour, but it does not seem to have been found again in the county. Montagu's Sucker (*Liparis montagui*, Cuv.) is evidently not uncommon, as it is frequently picked up under stones on the beaches of the south and west at low spring tide, and has been taken several times in rock-pools at Gyllyngvase Beach, Falmouth.

The Two-spotted Goby (*Gobius ruthensparri*, Euphr.) has generally been regarded as rare in Cornish waters, but in August, 1903, the writer dredged it in abundance from the edge of the *Zostera* bed downwards off the mouth of Helford River. Late in June, 1904, he obtained it in equal abundance in the entrance to Falmouth Harbour, and has obtained it several times since in Falmouth Bay. Specimens have also been sent in lately from Mevagissey and Marazion. Willughby's Goby (*Gobius paganellus*, Gmel.) is very common in Falmouth Bay, Mount's Bay, and round Land's End in rock-pools, under stones near low-water mark, or in shallow water with a stony bottom. It has also been identified from Polperro, Gorran, and from near Cadgwith. The Rock Goby (*Gobius niger*, L.) is abundant in rock-pools and in shallow water all round the coast. In clear waters it may be frequently seen in Gerrans Bay swarming round the "scuddy" rocks, that is, rocks just peeping out of a sandy bottom. The Giant Goby (*Gobius capito*, Cuv. et Val.) was found by F. Pickard-Cambridge in the rock-pools at Portscatho in August, 1903 (see the 'Field' for Oct. 24th, 1903).* On the 12th July, 1907, two were captured in a pool close to low-water mark at Gyllyngvase. It appears that Couch had identified his specimens as *Gobius niger*. The Freckled Goby (*Gobius minutus*, L.) is common in shallow sandy coves and estuaries all round the coast, but presents considerable variation. The Painted Goby (*Gobius pictus*, Malm.) is said to be abundant along the south coast. Jeffrey's Goby (*Gobius jeffreysii*, Günther) is a deep-water species that has

* Cf. also 'Zoologist,' 1903, p. 429.

been obtained near the Eddystone. A mature female of *Gobius scorpioides*, Collet, one of the smallest fishes known, was dredged by Holt in eighteen fathoms in Falmouth Harbour in July, 1897. The Transparent Goby (*Aphia pellucida*, Nardo) is abundant in Cawsand Bay in July, and has been taken in the Lynher above Waterlake in April (M. B. A.). Enormous numbers appear at times off Mevagissey followed by a shoal of Herrings, for which they constitute an attractive food supply. Great swarms have also appeared in Mount's Bay (Dunn f.). In June, 1906, several were taken in a hand-net at King Harry Passage on the Fal. The Crystal Goby (*Crystallogobius nilssonii*, Düb. et Kor.) is common in the deeper parts of Falmouth Bay and, to judge from the specimens sent in, plentiful around Mevagissey and locally in Mount's Bay.

The John Dory (*Zeus faber*, L.) is common all round the coast. During the winter the majority evidently prefer deep water, but throughout the summer it delights in shallow inshore water where weeds and small fishes abound. It may often be seen in great numbers following up shoals of Sprats and other small fry, and, though usually slow and sluggish in its movements, shows remarkable activity as it jerks backwards and forwards with its mouth open among the smaller fish that serve as food. Large specimens are often taken with bait, the most successful being a live young Chad fastened by the tail. When swallowed head first the spines of the Chad act as so many hooks. The finest fish are generally obtained by trawling in deep water, but good catches are often made in ground-seines both near the shore and two or three miles out at sea. The largest Cornish specimen that has passed through the writer's hands weighed 11 lb. The Boar-fish (*Capros aper*, L.) up till 1843 was regarded as one of the rarest of British fishes, but that year it appeared in large numbers from Plymouth westwards. Always very local, it vanished altogether in 1846, and was represented by an occasional solitary specimen up to 1870, when it became remarkably plentiful along the south coast of the county, and for nine years was so abundant locally as every now and then to fill the trawls. As it is not a marketable fish, it became in places a veritable pest. In 1879, after a violent east wind, it entirely died out, and, though occasionally taken on deep trawling-grounds, was not again seen in shallow water till 1894.

(Dunn). At present it is locally plentiful on the trawling-grounds off the south coast and in the west. It is frequently taken in Crab-pots, especially when set with Spider Crab. The Trumpet Fish (*Centriscus scolopax*; L.) is an extremely rare accidental vagrant from the Mediterranean. An undoubted British example was thrown on shore at Menabilly, near Fowey, in 1804. On the 16th of June, 1906, one of the writer's biology students found a dead specimen in good condition on some wet mud near the mouth of the Helford River, where it had evidently just been left by the receding tide. When the writer received it wrapped up in paper two days later the odour of decomposition was barely perceptible, so that presumably it must have died only a short time before it was discovered. The specimen, which is 6·3 in. long, has been placed in the museum of the Royal Institution of Cornwall.

Immense quantities of Mackerel (*Scomber scombrus*, L.) appear off the coast in spring and early summer, and are caught with drift-nets till the schools break up about the end of May or early in June, when they come more inshore, and are taken freely with the seine and the hand-line. The Cornish boats may in some years begin to fish with satisfactory results very early in January, but the regular fishing season is from March to June. At that period several hundred boats make their headquarters at Newlyn, and others at Looe, Mevagissey, Falmouth, and St. Ives. During March and April, the recognized time of the spring Mackerel fishery in Cornwall, the Looe boats fish for the most part five to twenty miles south-west to west of the Eddystone; the Mevagissey boats off the Dodman and Falmouth Bay; those from Newlyn and the neighbourhood off the Lizard to Wolf Rock and in Mount's Bay, and those from St. Ives ten to sixty miles off that port. In May and June, the time of the summer Mackerel fishery, the Looe fishermen go to great distances south-west of the Eddystone, the Mevagissey men usually fish forty to sixty miles south-west of the Dodman, the Mount's Bay men from south-west of Mount's Bay to within sight of Ushant Light, and from there to Cape Clear in the south-west of Ireland. They also at times make big catches outside the Bishop Rock, Isles of Scilly. The St. Ives men go sixty or seventy and in some years (*e.g.* 1905) ninety miles, N.N.W. round to N.N.E., and in some seasons fish

off the Isles of Scilly. The Cornish fishermen say that Mackerel is always most abundant where the water is green, and samples of such water is generally found to be very full of small "bait." In September and October the Mackerel, as a rule, return to deep water, but a few often linger behind, where small fish are plentiful, and grow rapidly in size. On the 26th October last year two were sent in from Falmouth, one of which weighed 2 lb. 1 oz. and the other 2 lb. 2½ oz. The Spanish Mackerel (*Scomber colias*, Gmel.) is an occasional visitor from the Mediterranean, sometimes in small shoals. In June, 1901, about fifty were brought into Newlyn from near the Wolf; in the early days of June, 1906, several were taken near Gerrans, and in the summer of 1907 Dunn f. saw two that had been brought in from Mount's Bay. The Short-finned Tunny (*Orcynus thynnus*, L.) is an irregular visitor, chiefly to the west of the county, from July to November. In September, 1899, several were taken in a Pilchard drift-net near the Wolf Rock; in July, 1901, two were obtained about three miles south of the Runnelstone, and on the 8th of November one was taken to the north of St. Ives; in August, 1906, two small specimens were sent in for identification out of a number that had been caught to the south of Mousehole Island. The Germon or Long-finned Tunny (*O. germon*, Lacep.) is a rare vagrant that has not been reported since 1846. The Pelamid (*Pelamys sarda*, Bloch.) has been much confused with the Short-finned Tunny. Occasional specimens have undoubtedly been taken off the south coast, but the only specimen handled by the writer was one weighing 4 lb. that had been taken in a Mackerel drift-net south of the Bishop early in June, 1903, and was reported in a local newspaper as a gigantic Mackerel. The Plain Bonito (*Auxis rochei*, Risso) is a very rare vagrant, not recorded since 1844. The Sucking-fish (*Echeneis remora*, L.) was obtained by Dunn f. in 1867, eighteen miles off the Dodman, and by Cornish from Mount's Bay in 1877. Several Cornish specimens of the Scabbard Fish (*Lepidopus caudatus*, Euphr.) are mentioned by Day, but none have been recorded since. The Silvery Hair-tail (*Trichiurus lepturus*, L.) has been taken at intervals, and, as a rule, singly along the south coast. One was obtained at the mouth of the Helford River on the 15th of December, 1899, and another at Sennen Cove, near the Land's

End, in January, 1905. The Sword-fish (*Xiphias gladius*, L.) is occasionally reported by fishermen, but rarely captured. Several instances of the occurrence of Ray's Bream (*Brama raii*, Bl. Sch.) on the Cornish coast are collected by Day. In March, 1891, a specimen about 1 ft. 8 in. long was taken with a gaff at Portscatho, and sent to the Marine Biological Laboratory by Matthias Dunn. On the 12th of March, 1905, after a violent storm, a large specimen was thrown up dead near St. Anthony Lighthouse, Falmouth. In 1887 one was obtained in a Grey Mullet seine at Scilly—the first capture off Cornwall in the open sea (Cornish). Two occurrences of the Opah or King-fish (*Lampris luna*, Gmel.) are recorded by Day, but it does not seem to have been taken since 1865. The only two known British examples of *Luvarus imperialis*, Rafin., were obtained in Cornwall, one off the Dodman on the 30th of April, 1866, and the other exactly five months later at Falmouth.

The Scad or Horse-Mackerel (*Caranx trachurus*, L.) is common and locally abundant in all the Cornish seas, usually appearing in April and returning to deep water in October, but the young often swarm in the coves throughout the winter. Being of little commercial value, it is often very troublesome to Cornish Mackerel and Pilchard fishermen by literally filling their nets. This year (1907) it has been unpleasantly abundant in the west about Scilly. The Pilot-fish (*Naucrates ductor*, L.) is of frequent occurrence, not only as a companion of Sharks, but also as a follower of vessels. One was taken in Falmouth Bay on the 30th of September, 1899; two at Penzance in November, 1903; and one close to St. Mawes on the 23rd of June, 1907. Two examples of the Derby (*Lichia glauca*, L.) have been taken in the west, the last in 1878. A stray specimen of *Lichia vadigo*, Risso, 19 in. long, was taken in a Pollack-net off Prussia Cove in 1892 (Günther, Ann. & Mag. Nat. Hist. ser. 6, x. 335). The only British example of the Rudder-fish (*Pammelas perciformis*, Mitchill) was found alive in a floating wooden case about six miles from Penzance in October, 1874. About two dozen examples of the Black-fish (*Centrolophus pompilus*, L.) are recorded from Cornwall by Day. Holt describes six or eight small specimens, 12 to 14 in. long, taken in a Mackerel-net near the Runnelstone in 1891 (Journ. M.B.A. ii. 265). In June, 1900, a

Mevagissey Mackerel-boat that had been disturbed in its operations south of the Dodman by several Porbeagle Sharks, brought in a specimen that measured $18\frac{1}{2}$ in. in length. Dunn f. says it has appeared in Mackerel-nets once or twice lately in the mouth of the Channel. The Cornish Centrolophus (*C. britannicus*, Günther) is a doubtful species. The only known example was thrown up on the shore near Looe in February, 1859.

The two Weevers are deservedly dreaded by bathers, fishermen, and shrimpers, because of the poisonous spines of the operculum and first dorsal fin. The Greater Weever (*Trachinus draco*, L.) is locally not uncommon at times round the coast on sand and fine gravel from between tide-marks downwards. It seems to be of most frequent occurrence where Shrimps abound. The Lesser Weever (*T. vipera*, Cuv. et Val.) is apparently scarcer in the west of the county than the other, but is elsewhere locally common on similar ground. The gorgeous adult male of the Dragonet or Skulpin (*Callionymus lyra*, L.) is frequently obtained on sandy or gravelly bottoms at a depth of twenty-five fathoms downwards both off the south and north coasts, and may be common. The female evidently prefers shallower water, while the young are often plentiful close inshore. A fully developed male of the Spotted Dragonet (*C. maculatus*, Bonap.), a distinctly northern species, was trawled by Holt in Falmouth Bay in July, 1897, at a depth of thirty to thirty-five fathoms.

The Cornish Sucker (*Lepadogaster gouanii*, Lacep.) is common on the south coast in small rock-pools, under stones between tide-marks, and in shallow water. On the north coast it seems to be scarce or very local. The Double-spotted Sucker (*L. bimaculatus*, Flem.) is by no means so common. During the past eight years it has been dredged at a depth of fifteen fathoms at Polperro, and up to twenty-five fathoms in Falmouth Bay. It has also been taken at low spring tide at Gorran, Gyllyngvase, and near Mousehole, and dredged in shallow water in Nanjizal Bay, Land's End. Couch is evidently the only naturalist who has obtained the Connemara Sucker (*L. decandollei*, Risso) off the Cornish coast.

(To be continued.)

NOTES AND QUERIES.

AVES.

The First Recorded British Example of the White-spotted Bluethroat.—Having recently had an opportunity of examining the disputed specimen of the White-spotted Bluethroat, obtained near Scarborough in April, 1876 (*cf.* Zool. 1902, p. 464; 1903, pp. 23, 431, 455; 1904, pp. 31, 263), and which I exhibited at the British Ornithologists' Club on the 16th October last, I am pleased to be able to state that its identity is fully established. It is in every way typical of the white-spotted form (*Cyanecula wolfi*), the white in the centre of the blue throat being most distinct, and about half an inch in diameter. The plumage, even after the lapse of thirty years, still retains its deep intense hue. On questioning the present owner of the specimen as to the facts of the occurrence, he corroborated in every respect the original statements of the Rev. J. G. Tuck and Mr. W. Eagle Clarke, though, as the females of the two forms of Bluethroat cannot be distinguished, it is unfortunate that a misleading statement was made as to the sex of this example, which accounts for its rejection by the authors of recent ornithological works. In case any sceptic may proffer a suggestion that it was an imported skin, my informant added that he remembers his father bringing home the bird, telling him he had found it below the telegraph-wires, and at the same time pointing out where it had been damaged by coming in contact with them. For further particulars inquirers are referred to the 'Birds of Yorkshire,' i. pp. 38, 39. —T. H. NELSON (The Cliffe, Redcar).

Status of the Grey Wagtail (*Motacilla melanope*) in Yorkshire.—Referring to the notes on this subject (*ante*, pp. 151 and 382), I may state that this species is sparsely distributed along the moorland becks immediately to the north of Scarborough, the eastern boundary of the breeding haunts in Britain of this and several other species of birds. —W. GYNGELL (Gladstone Road, Scarborough).

Richard's Pipit at Yarmouth. — An example of Richard's Pipit (*Anthus richardi*) was netted on the North Denes at Yarmouth on October 22nd, and is now in the possession of Mr. W. Lowne. A few

other specimens have previously been reported here at long intervals. The first one recorded for Norfolk was obtained in the same locality in November, 1841. Although an autumnal migrant, it is sparingly met with in Great Britain; yet it is freely distributed in the southern parts of Europe during the winter. I once saw one of these large Pipits searching for food amongst the aquatic herbage which grows on the rands on the north side of Breydon in September, 1890. I noticed how extremely active it was in its movements. A Lark being near, I had a fine opportunity of observing the two species at one view.—B. DYE (Row 60, No. 10, Great Yarmouth).

Eggs of Red-backed Shrike (*Lanius collurio*).—It may interest your readers to learn my experience relative to this subject, and it will be interesting to me to know of their observations in the same direction. It seems common knowledge that many of our summer migrants return each year to the same nesting locality, and as an instance I will cite the bird under notice as one species apparently possessed of this habit. In the county of Wiltshire I know of two spots, about six or seven miles apart, where a pair of these birds are regularly to be found during the period of their stay with us, and my observations respecting the two nests extend over the years 1903, 1904, 1906, 1907. The first pair were noticed in 1903 near a railway bank, and their nest contained five eggs of the grey variety. They were seen in the same place in 1904, but the nest was not located. In 1905 no visit was made by me, but in 1906 they had again returned, and the nest discovered within a few yards of the one previously found in 1903. This contained as a full complement four eggs only, which on this occasion were of the pink variety. My observations of the second nest were made within the past two seasons (1906-7). The nest, situated about five feet from the ground in an overgrown thorn hedge, contained six eggs of the grey type, while the one discovered this year (1907) and situated quite near the other had five eggs, which were marked with pink blotches rather than spotted—quite an unusual type. It will therefore be seen from these remarks that, although the eggs were found in precisely the same localities—indeed, a few yards only was the space between each year's nest in both cases—the eggs varied in colour as described above. My contention is, on the face of this experience, that the eggs are liable to this variation, and that there is little doubt that they belong to the same birds which return each year. While dealing with this subject I should like to mention that with regard to the eggs of the Cuckoo I have found no variation whatever, after some years of careful observation in certain localities. In one

district I found eggs of the Cuckoo all in Sedge-Warblers' nests, and absolutely identical, for four successive seasons (1903-6 inclusive), which leaves no doubt in my mind that the eggs were the production of one bird. This certainly seems very remarkable when one considers for a moment all the risks migration entails.—D. W. MUSSEL-WHITE (7, Jessica Road, Wandsworth Common).

Spread of the Little Owl in Herts.—Noticing the note in the last number of 'The Zoologist' (*ante*, p. 384) about this species, I thought it might be of interest to record what I could find out about it in the neighbourhood of Ware, Herts; so I wrote to my grandfather, T. F. Buxton, Esq., of Easneye, Ware, to ask him what he had observed in that neighbourhood. He tells me that they first appeared in the spring of 1897; that year they nested in an old pear-tree at Little Briggins Farm. They brought off two young, one of which was picked up dead. The old birds and the single young one stayed about, and next spring (1898) they nested again. This time it was in the loft of a barn, among some hurdles which were being stored there. No one knew of the nest until, unfortunately, it was found and disturbed in removing the hurdles for use. The foreman in charge at once stopped the work and locked the loft, but the nest with four eggs was deserted. The Owls stayed about till that autumn, and then disappeared. This species is still sometimes heard of in that neighbourhood.—P. A. BUXTON (32, Great Cumberland Place, London, W.).

Little Owl (*Athene noctua*) Breeding in Hertfordshire.—In connection with Mr. Stuart Maples' note on the occurrences of the Little Owl in Hertfordshire during 1906 (*ante*, p. 353), and Mr. Steele-Elliott's account of the spread of the species in Bedfordshire (pp. 384, 385), it will be of interest to record that the Little Owl has been discovered breeding in Hertfordshire in two instances this past spring. A nest was found about the middle of June near Watton-at-Stone by some boys who saw the parent bird fly from a decaying oak. The nest was in a deep hole about ten feet from the ground, and contained four young just ready to fly. They were caught the same evening when they left the nest-hole and perched on the branches to be fed. Two of them were released after being kept in captivity for some weeks; the other two are still in cages in this village, and are in good health and plumage, having become quite tame. Mr. W. Percival Westell has informed me of another nest found this year between St. Albans and Hatfield. It was in a hole in a willow-tree, and, although one of the birds was shot by a keeper, the young were safely reared. Mr. Westell adds:—"Several keepers have reported to me the presence of this

interesting bird, and I know it is present in the Watford district. As far as I remember, I first saw a specimen here about five years ago, but the past season is the first I have known for it to nest here." There is, however, a record of this bird having nested in Hertfordshire in former years. Dr. Hartert informs me that a pair nested and reared two young in 1897 on one of Mr. T. Fowell Buxton's farms at Easeneye, near Ware. In the following year they again nested on the same farm in the loft of a barn, where, however, they were disturbed, and deserted their eggs. It is quite probable that the discovery of two nests in different parts of the county this year, together with the frequent appearance of the bird during the last year or two, points to the permanent establishment of the Little Owl as a resident species in Hertfordshire, as in Bedfordshire and Northamptonshire. — ALLAN ELLISON (Watton-at-Stone, Herts).

Peregrine and Greenshank.—A Peregrine Falcon, at the entrance to Breydon, on October 17th, gave chase to a Greenshank, which sent forth repeated terrified shrieks in a single clanging note. When nearly overtaken the hunted bird pitched head first into the water, and dived and swam in a most active fashion. The Falcon, baffled for the moment, wheeled round, when the wader again took to wing, loudly voicing its indignation and terror. It was again harried, only to repeat its diving and swimming. A friend of mine at this moment ran into his boat-shed to procure his gun, with the intention of securing the Peregrine if possible. A third time the swoop of the pursuing bird proved unsuccessful, when it gave up the attempt, and made back for Breydon; the Greenshank, profiting by its retreat, winged its way across the town beachwards. — ARTHUR H. PATTERSON (Ibis House, Great Yarmouth).

Early Nesting of the Green Cormorant.—This year the Green Cormorants or Shags (*Phalacrocorax graculus*) started nesting remarkably early in Orkney. They commenced building their nests in January, and the first eggs were found on February 24th on the island of Sules Skerry. The weather during these months was very stormy but not cold, and perhaps this latter fact had something to do with their early nesting, which is much earlier than has ever been known in Orkney before. — H. W. ROBINSON (Lansdowne House, Lancaster).

Flock of the Glossy Ibis in Orkney.—On September 24th a flock of nineteen or twenty Glossy Ibises (*Ibis falcinellus*) appeared at Sandwick, in Orkney, a small township about four miles inland, and about

eight miles from Stromness, where they frequented some marshy ground there. The man who made the discovery did not think of shooting them at first, and so for three days they remained in peace; but on the 27th this idea seemed to strike him, and from this date until October 1st he shot two or three each day as they were feeding in a burn, until he had accounted for no fewer than ten. They were very wary, and rose high in the air when disturbed. Most of them were sent, I believe, to Mr. Mallock, of Perth, and it would be interesting to know whether they were old or young birds. I do not think there are a dozen records of this bird having visited Scotland, and the occurrence of a flock of them in Orkney is most unusual, as I believe the species has only occurred twice before in these islands—*viz.* a young bird near Stromness on September 19th, 1903, which I mentioned in the 'Field,' &c., at the time; and another near Kirkwall as long ago as September, 1857, exactly half a century ago. It will be noticed that the three occurrences were all in September during the autumn migration.—H. W. ROBINSON (Lansdowne House, Lancaster).

Nesting of the Lesser Tern in the Outer Hebrides (*ante*, p. 386, and 'Field,' September 28th, 1907).—At the time Buckley and I issued the volume of our series of faunas relating to the Outer Hebrides we were not aware of any *authentic* instances of the nesting of the Lesser Tern anywhere in these islands. (It ought always to be remembered that we have consistently advocated chronological sequence of records.) But later I have recorded the earliest instances known of its nesting, and these will be found noted in my "Avifauna of the Outer Hebrides" (Annals Scottish Nat. Hist., April, July, and October, 1902; and January, 1903, p. 15, of the latter Annals and number). May I also refer your correspondents upon this subject to a still later article by Mr. Donald Guthrie, "Notes on Birds of South Uist, Outer Hebrides" (*op. cit.*, April, 1903, p. 78). At those places the correspondents—in 'Zoologist' and 'Field'—will learn the true sequence of the dispersal of this species in the Outer Hebrides. The locality *given* (Zool. *loc. cit.*) near North Uist indicates a further dispersal of the species, and certainly, so far as I am aware, it is the most north-westerly recorded.—J. A. HARVIE-BROWN (Dunipace, Larbert, Stirlingshire, N.B.).

Is the Black-headed Gull an Egg-thief?—In the last number of this Journal (p. 387) my friend Mr. E. P. Butterfield relates his experience respecting the behaviour of a number of Black-headed Gulls and Lapwings on the breeding-grounds of the latter, and (presumably) during the nesting season of the Lapwings. Mr. Butterfield did not

see any egg taken, nor any deliberate attempt to take any by these Gulls, but was convinced that the visits of the Gulls "were not mere chance visits, but were for some special purpose." The only inference is that the Gulls wanted the eggs of the Lapwings, or else some special food from the ground whereon the Lapwings were nesting. Until I can get some actual proof of egg-stealing by the Black-headed Gull, I shall continue to believe that in this case the Gulls' object was not in any way to interfere with the eggs or young of the Lapwings. Although I know the district between Cray and Buckden Pike fairly well, I have never witnessed anything of a similar nature between Black-headed Gulls and Lapwings, either there or in any other part of this district. I do not wish to doubt a single word of Mr. Butterfield's statement, as I know him too well, and have known him so long, to feel certain that he would present the facts as fairly and as accurately as it would be possible to do so. But Lapwings are very jealous guardians of their nesting areas, and will promptly fly at any fair-sized bird of very diverse habits which happens to cross their chosen territory. I will only say that for the past few years I have endeavoured (in this district) to bring to light a single fact to justify the statements of a *few* local gamekeepers that the Black-headed Gull is a harrier of eggs; but up to now I have not met with a single jot of evidence to bear out this accusation—but I have learned much which tends to prove the contrary. Last year, on the margin of one of our large reservoirs (where is situated the largest breeding colony of Black-headed Gulls in this neighbourhood), a Common Sandpiper made its exposed nest, and deposited its four eggs. The water rose in the reservoir, and presumably covered the nest and eggs, and the birds deserted them. The water receded and left the eggs fully exposed to view. Now this particular spot is always a favourite resting-place of the Gulls, and as we approached quite a score of them arose from around the Sandpiper's deserted nest and eggs. But even at the end of the season (on July 28th) the four eggs remained untouched and intact, still neatly arranged with the small end pointing inwards. No excuse even could be made that the eggs were set, or they would have floated away, or would have become deranged with the rising of the reservoir. This convinced us that the Black-headed Gull did not interfere with Sandpipers' eggs, whatever it might do with those of the Grouse or Lapwing. The same year a nesting colony of these Gulls were greatly persecuted and fired at by the gamekeepers for their supposed robbing the eggs of game-birds; so that eventually about a dozen pairs nested near to a small tarn on a moor a few miles away. Fortunately the shooting there was

under the control of a good sportsman and a fairly good ornithologist, and one of the best known public men in the district. Consequently the Gulls were allowed to rest in peace. After the shooting season the same gentleman informed me that at the particular part of the moor where the Gulls had nested they had made the best "bag" of Grouse, and better than in any past season on that part of the moor; and that he had remarked upon this fact to his keeper at the time. Unfortunately he would not permit me to make known the full data for fear that it might "only be a coincidence." Although I do not wish to infer that the *increased* "bag" was in any way due to the Gulls, it is quite clear that their presence on this particular spot had not been of disadvantage to the Grouse. Referring to the insinuations of certain gamekeepers—it is much more likely to be the work of Rooks, Crows, or Jackdaws, and probably of Lesser Black-backed Gulls, which latter now pay regular visits in small parties, or in honeymoon pairs, to this district at just about the laying-time of the Grouse. With the average gamekeeper a Gull *is a Gull*, just as a Hawk *is a Hawk* (even if it should prove to be a Cuckoo when shot). So far as I can see, the Black-headed Gull is essentially a farmer's friend, and a scavenger in this district. Almost any day during the spring and summer a few of them may be seen "fishing" on the River Aire below Shipley, and after the admission of the Bradford Beck (now almost a main sewer), and where the water is almost inky-black, and nothing but a Rat can live in it.

In the above I have only spoken for the Black-headed Gull in this district (where it is a summer visitor, arriving early in March and leaving at the end of September or early in October), where it has largely increased as the result of the construction of numerous sewage-beds along the Aire Valley. No doubt in districts where large gulleries are strictly preserved, and where no check is placed upon their increase, the birds will have to alter their food in order to meet the increased demand; but even under such trying circumstances I should be much surprised to learn that this species had taken to egg-stealing.—HARRY B. BOOTH (Shipley, Yorks).

Pomatorhine Skua at Yarmouth.—On October 23rd an immature example of the Pomatorhine Skua (*Stercorarius pomatorhinus*) was shown me in the flesh, and which had a few days before been captured by the crew of a fishing-lugger, among whose nets it had come to grief. The under parts were white, with a beautifully speckled gorget, very much resembling a Sanderling in the nuptial plumage. Some bars on the back were edged with fawn colour. Unfortunately the bird was

useless as a specimen, the throat being greasy, while round the base of the bill the feathers were already very loosely attached. On opening the mouth I noticed some tiny larvæ of the blowfly, which rather surprised me; but it is just possible that in the warm cabin of the boat, situated as it is near the engines, sundry bluebottles had shipped themselves as members of the crew. — ARTHUR H. PATTERSON (Ibis House, Great Yarmouth).

ARACHNIDA.

Chelifer cancroides (Linn.).—It was a surprise to me to read, in 'The Zoologist' (*ante*, p. 388), that the Rev. O. Pickard-Cambridge was only able to refer to four British specimens of *Chelifer* in 1892. *Chelifers* of this species have always been fairly common in this neighbourhood, and I have generally met with a few when sifting dead leaves in search of minute *Helices*, especially amongst beech and hawthorn leaves. A paper on Pseudoscorpions was read before the Quekett Microscopical Society on October 25th, 1867, and in the discussion which followed it was stated that nine species of the genera *Chelifer* and *Obisium* had then been found in Great Britain. The excellent microphotograph of *Chelifer cancroides* in 'The Zoologist' will, I hope, be followed by similar photos of the other British species. — JOHN R. B. MASEFIELD (Rosehill, Cheadle, Staffordshire).

OBITUARY.

HOWARD SAUNDERS.

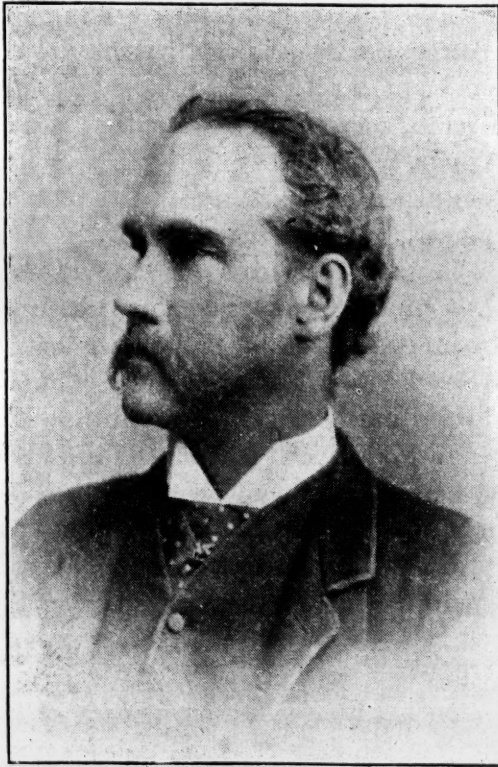
It is with deep regret that we have to record the death of Mr. Howard Saunders, F.L.S., F.Z.S., F.R.G.S., which occurred at his London residence on Sunday the 20th of October. After a long and painful illness, which he bore with the most heroic fortitude, he passed away at the age of seventy-two. His loss will be mourned by a very wide circle of friends and acquaintances in all parts of the world, but more particularly by ornithologists, for, though a man of many and varied tastes, he was best known through his writings on birds, and was more especially famous as the author of the widely known 'Manual of British Birds,' and for his monograph of the Gulls (*Laridæ*), which formed part of volume xxv. of 'The Catalogue of the Birds in the British Museum' (1896).

Mr. Saunders's death, following so closely on that of Prof. Alfred Newton, makes the year 1907 an extremely sad one in the history of ornithology, for these two men were universally acknowledged to be our most learned authorities on British Birds. All difficult questions relating to British ornithology were invariably referred to one or other of them, and no one ever appealed for help without obtaining the fullest information and the soundest advice.

Mr. Saunders was born in London in 1835, and was educated at Dr. Gavin Smith's school at Rottingdean, where at an early age he displayed a special interest in birds, and made his first recorded observation. Born of an old and honourable merchant family of the City of London, he received during his early years a business training, which may be traced in his accurate and methodical manner of dealing with any subject he undertook. All his writings bear testimony of the same careful and painstaking treatment, and it is not too much to say that his 'Manual of British Birds,' which is perhaps the best and most widely appreciated of his works, will always remain a model of accuracy and learning compressed into the smallest possible bulk. To each species he devoted only a page and a half of letterpress, but within that limited space he managed to include not only a complete description of its various plumages, but its geographical range, habits, and all other important details.

At the age of twenty Mr. Saunders left England in the clipper-ship 'Atrevida,' bound for South America, and his observations on the Albatrosses noted during the voyage were published in a letter to the 'Ibis' for 1866. During 1855 to 1856 he visited Brazil, Chile, and

Peru, and remained in the latter country until 1860, his time being chiefly spent in antiquarian researches, and in acquiring a perfect knowledge of the Spanish language. Subsequently he made a remarkable journey across the Andes to the head-waters of the Amazon, and descended that river to Para. Thence he returned to England, where he devoted the greater part of his time to the study of ornithology. Between the years 1863 and 1870 he paid frequent visits to Spain, his proficiency in Spanish being of great use to him during his travels. The results of his observations on the birds of the Spanish peninsula



were published in a series of articles which he contributed to the 'Ibis,' 1869-1872.

In 1868 Mr. Saunders married Emily, daughter of the late William Minshull Bigg, and his marriage proved an exceedingly happy one, for his wife took the keenest interest in his work, and the help which she afforded him in his scientific career cannot be too highly spoken of. His house was open to all naturalists, and it was one of his boasts that no one could ever upset his household arrangements or prove *de trop*, as he was always prepared for any chance visitors either at lunch or at dinner. In 1870 he was elected a member of the British

Ornithologists' Union, and took a leading part in its conduct, being still Secretary at the time of his death. He was twice Editor of the 'Ibis,' from 1883-1886, and again from 1895-1900. From 1880-1885 he was Honorary Secretary to Section D of the British Association for the Advancement of Science. He was a Fellow of the Zoological, Linnean, and Royal Geographical Societies, and served on the Councils of all of them, and from time to time contributed valuable papers to their 'Proceedings.' He was also a Member of the Société Zoologique de France, Honorary Member of the American Ornithologists' Union, and of various other European societies.

It is impossible to estimate too highly the value of his life's work in the cause of Palæarctic Ornithology, but he did not devote himself solely to the study of birds, for he took the deepest interest in geographical research, more especially in that relating to the Arctic and Antarctic regions.

His ornithological writings were noted for their excellence rather than for their number, for Mr. Saunders was by no means a voluminous writer. In 1882 he took over from the late Professor Newton the editorship of the fourth edition of Yarrell's 'British Birds,' and in the most admirable manner re-wrote the third and fourth volumes which were still required to complete the edition. Subsequently he conceived the idea of writing his greatest work, the 'Manual of British Birds,' mentioned above, which was published in 1889, and passed through a second edition ten years later. On this subject we have already touched, as also on his monograph of the Gulls. On these latter, to the study of which he had devoted the greater part of his life, he was undoubtedly the greatest authority in the world, and he possessed a remarkably fine collection of their skins, which was acquired by the Trustees of the British Museum in 1894. He presented to the nation his fine collection of eggs of Gulls and Terns, and, from time to time, numbers of skins of birds from Southern Spain and other parts of the world.

He was always ready to place at the disposal of others his great store of information, and a large number of books written by his friends passed through his hands for revision. He was a man of singularly sound judgment, and possessed of a wonderful sense of proportion, consequently his help and sympathy in both public and private difficulties were constantly sought and invariably forthcoming. The loss of such a man and such a friend has plunged the little community of British ornithologists into heartfelt sorrow.

W. R. OGILVIE-GRANT.

NOTICES OF NEW BOOKS.

Notes on the Birds of Rutland. By C. REGINALD HAINES,
M.A., &c. R. H. Porter.

THIS is a small book relating to a small avifauna of a small county, but a sterling ornithological publication, for not only is a carefully compiled account given of the 200 birds included with certainty in the fauna, but in the introduction some cogent reasons are given why more birds could scarcely be expected in the confines of this county. There is, of course, no sea coast, which means much; of its area of little over 100,000 acres not 100 acres are waste land or heath, and not 200 acres are water; there are scarcely 400 acres of woodland, while orchards cover less than 150 acres; permanent pasture absorbs more than half of the whole area, and rotation crops account for another 36,000 acres. In reading such facts as these we feel confident that the time will soon be at hand when some competent and philosophical ornithologist will, with all the excellent county bird books now available for consultation, write a volume on the natural conditions which effect the distribution and status of birds in the different counties of Great Britain.

The Rutland birds have waited for a recorder; Montagu Browne had not studied the birds of the small county as he had those of Leicestershire; and we are told that, "with one important exception, there are no records or notes bearing upon the subject which date back more than a hundred years." Mr. Haines has therefore rendered a distinct service in giving us, what cannot be doubted is, an adequate account of the birds of our smallest English county.

The Nervous System of Vertebrates. By J. B. JOHNSTON,
Ph.D., &c. John Murray.

THIS is an important book for the serious student of animal evolution, though its method and practice are rather more abstruse than the bionomic and distributional features largely

followed in the pages of 'The Zoologist.' In the author's words, an attempt has been made "to give an account of the nervous system as a whole, to trace its phylogenetic history, and to show the factors which have determined the course of evolution." This functional point of view is intended to supply a study of the nervous system to supplement our observations on animal bionomics; we record the action; Prof. Johnston seeks to describe the nervous system by which it is produced, and its evolution or unfolding from primitive to more specialized forms. Such a book for detailed review would be beyond the scope of 'The Zoologist.' We will, however, advise its study by any sufficiently advanced student who can follow its method by the possession of sufficiently acquired familiarity with experimental and anatomical methods. Our conception of evolution is largely dependent for its accuracy on such knowledge, but most zoologists are, in their decisions on this great question, very much in the position of a jurymen whose verdict is not inconsiderably influenced by the light and leading of the personage who occupies the judge's chair. We cannot escape it; many facts and much opinion must necessarily be acquired "second-hand."

We have only one discrepancy to point out. In the chapter devoted to "The Evolution of the Cerebral Hemispheres" the author writes that in man they are larger and more complex than "in animals"; unless the word "other" is interposed between these last two words, what becomes of evolution?

A Correction.—In our notice of Mr. Le Souëf's 'Wild Life in Australia' (*ante*, p. 391), we expressed regret that there were no generic and specific names to distinguish the animals referred to in that very interesting book, which we read from start to finish. It has since been pointed out to us that an "Index of Scientific Names" is inserted *after the Index*. We did not read beyond the index, and though we much regret our statement, we think that the publishers are largely to blame in inserting that appendix in such a position (without any reference to it in the text), though it is included in the "Contents." We read neither "Contents" nor "Index," being absorbed in the other pages of a delightful narrative.





SEA-EAGLE (*Haliaeetus albicilla*) ON A CARCASS.